



Some new Black Mildew, *Asterina*, collected from North -Western U.P.

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Abstract

During the morphotaxonomic studies of Black Mildews from Himalayan foothills of North-Western Uttar Pradesh, 20 species of *Asterina* were collected. Out of these, *Asterina syzygicola* collected on *Syzygium jambolanum* and *Asterina heniana* collected on *Syzygium henianum* are described and illustrated as new to science

Keywords: Fungi, Black Mildew, *Asterina*, Diversity, Morphotaxonomy.

INTRODUCTION

Black Mildews are ectotrophic, obligate parasitic fungi mostly occurring on highest plants in tropical and sub-tropical climatic belts. These are mostly follicolous and host specific in nature. They produce coloured hyphae and fructification. Much is known about these fungi from South India (Hosagoudar, 1996) and other several countries. However, little is known about these fungi except a few fragmentary reports from Himalayan ranges.

During our recent survey of forest vegetation of Himalayan foothills of North-Western Uttar Pradesh a large number of black mildews including 20 species of *Asterina* were collected. Out of these 20 species of *Asterina*, *Asterina syzygicola* collected on *Syzygium jambolanum* (Myrtaceae) and *Asterina heniana* collected on *Syzygium henianum* are described and illustrated as new to science. The Holotype specimens have been deposited in Agharkar Mycological Herbarium, Pune, Maharashtra.

MATERIAL AND METHODS

Lactophenol – cotton blue mounts of scrapping from the infected leaves were prepared for study. Camera Lucida drawing were made so as to reveal the diagnostic features of the fungi. Holotype specimens were deposited in Agharkar Mycological Herbarium, Pune, Maharashtra.

Species were collected from Himalayan foothills of North-Western Uttar Pradesh and fresh herbarium was prepared by pressing and drying intermittently. After drying, mounts of the infected leaves were prepared.

Taxonomic Descriptions

Description and illustrations of new taxa are presented here as under-

Asterina syzygicola sp. nov.

Maculae amphigenae, brunneolus fuscae, orbiculares, dispersae/aggregatae, densae, durae effusae fragmentae, ad 85 mm. diam., coalescentes extendes per totam folii. *Mycelium* superficialibus, ex hyphis laxa reticulatae, atro brunneae, septatae, ramosae, undulatae, cellulae 4.4 – 8.8 μ m diam., irregulariter ramosae. *Hyphopodia* unilateralia, cellula-2, interdum unicellula, 12.3-21.0 x 5.5- 9.4 μ m, atro-brunnea, recta vel curvula, cellula basali parvula, cylindracea vel cuneata, cellula apicali capitata, globosa vel hemiglobosa. *Thyriothecia* dispersa vel aggregata, orbiculares, medius measure 115.0-158.2 μ m diam. , convexa, atrobrunnea, hymenium simplicia, margine fimbriata. *Asci* orbiculares vel ovals, sessilis, & sporae, 36.8-58.1 x 60.9 - 68.1 μ m. *Ascospores* congestae, ellipticae, oblongae, uniseptatae, ad septatum constrictae, rotundate ad demum, subcaeruleus vel brunneolus flavae, glabro tunicatae, 8.0 - 16.3 x 24.0-37.5 μ m.(Fig.1;a,b,c,d,e)

In foliis vivis *Syzygium jambolanum* (Myrtaceae) leg. M.A. Nomani, 18 January, 2010, Katarnia Ghat Wildlife Sanctuary, U.P., MAN/SCT 17/26 isotype, Accession No. AMH-9503 Holotype.

Infection spots amphigenous, forming brownish black, circular, scattered or aggregated, dense, hard, widely effused patches upto 85 mm in diameter, coalescing to cover almost whole leaf surface but it original shape remains intact. *Mycelium* superficial, loosely reticulate, composed of dark- brown, septate, branched wavy hyphae , individual cells measuring 4.4 – 8.8 μ m in diameter, branching irregular; *Hyphopodia* mostly unilateral if bilateral it alternately arranged mostly bicellular sometimes unicellular, measuring 12.3-21.0 x 5.5- 9.4 μ m, dark brown, straight to bent, lower cell of hyphopodia smaller, cylindric to cuneate, head cell capitate, spherical to hemispherical. *Thyriothecia* many, scattered or group, present in the mycelial colonies like alpin heads, rounded about 115.0-158.2 μ m in diameter, dimidiate with radiate scutellum stellately dehiscing at first, subsequent developing into an aperture, convex, dark brown, hymenium simple, margin fimbriate; *Asci* many, rounded to oval, sessile, 8- spored, measuring , 36.8-58.1 x 60.9 - 68.1 μ m. *Ascospores* crowded, elliptical, oblong, uniseptate, constricted at the septum, rounded at ends, bluish brown to brownish yellow, smooth walled, measuring , 8.0 - 16.3 x 24.0-37.5 μ m.

On living leaves on *Syzygium jambolanum* (Myrtaceae) leg. M.A. Nomani, 18 January, 2010, Katarnia Ghat Wildlife Sanctuary, U.P., MAN/SCT 17/26 isotype, Accession No. AMH-9503 Holotype.

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A review of literature concerning taxonomy of *Asterina* species indicates that no species of this genus has earlier been described on the host species. However, this genus resembles with *Astrina jambolanae* on *syzygium jambolanum*. The morphotaxonomic character of allied taxa and present species are shown in table-1.

As gathered from the data in table-1, the present collection is

distinct from allied taxa in having irregularly branched mycelial hyphae which are brown in colour, longer and wider hyphopodia ; Thyriothechia scattered or grouped like alpin head and smaller; Asci smaller and wider as well as bluish brown to yellow coloured ascospores.

Therefore, the present collection has been treated here as a new taxon of species rank.

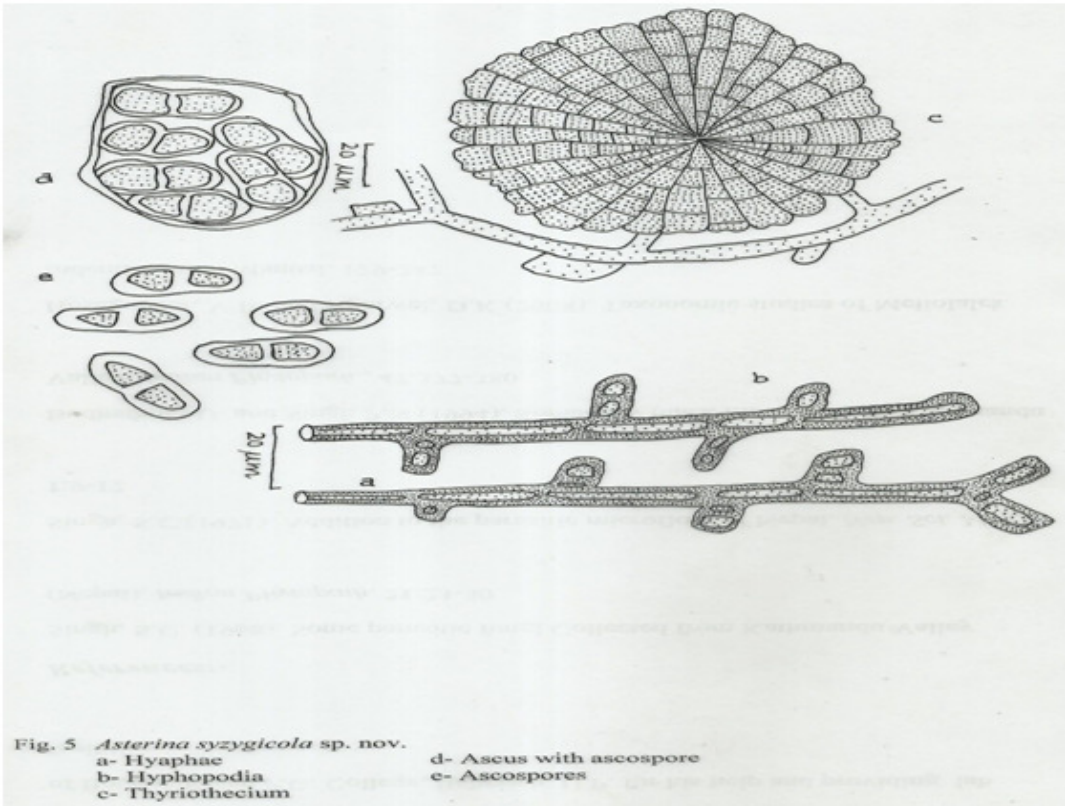


Table 1. A comparative account of morphotaxonomic features of *A. jambolanae* Kar & Maity (1970) with *Asterina syzygicola* sp.nov.

Species	Infection spots	Mycelium	Hyphopodia	Thyriothechia	Asci and Ascospores
<i>A.jambolanae</i> Kar & Maity (1970)	Both surface but vigorous growth on the upper surface, dense, effused, 6 mm in diameter.	Superficial, closely reticulate, brown branching alternate or one sided, rarely opposite 4-6.6 um in diameter.	Alternate or one sided, 2-celled, straight or bent, antrorse, 6.6-14.8 x 6.6um.	Scattered or in groups, 198-331.5um in diameter, convex, dark brown like pin heads.	Asci rounded to oval arranged towards the periphery of the fruiting body, sessile, 56-72.6x 36.3-51 um, Ascospores elliptic, oblong, uniseptate brown, 33-34.6x15.8 um.
<i>A.syzygicola</i> sp.nov.	Usually upper surface, black, scattered, orbicular 85 mm in diameter.	Superficial, loosely reticulate, rarely one-sided, straight to sub-straight.	Alternate to irregular, unicellular, cylindrical straight, or slightly bent, 12.3-21.0x5.5-9.4 um.	Scattered or grouped, like pin head, rounded,115.0-158.2 um in diameter.	Asci arising towards the periphery of the Thyriothechia, fusiform, elliptical, sessile 36.8-58.1 x 60.9-68.1 um, paraphysate, Ascospores abovate, uniseptate, upper cell larger, 13.2 um in diameter, lower cell 8.0-16.3x24.0-37.5 um.

***Asterina heniana* sp. nov.**

Maculae amphigenae, brunneolus fuscae, orbiculares, dispersae/aggregatae, densae, durae effusae fragmentae, ad 80 mm. diam., coalescentes extendes per totam folii. *Mycelium* superficialibus, ex hyphis laxa reticulatae, atro brunneae, septatae,

ramosae, undulatae, cellulae 4.5-8.7 um diam., irregulariter ramosae. *Hyphopodia* unilateralia, cellula-2, interdum unicellula, 12.2-20.5 x 5.6-9.3 um, atro-brunnea, recta vel curvula, cellula basali parvula, cylindracea vel cuneata, cellula apicali capitata, globosa vel hemiglobosa. *Thyriothechia* dispersa vel aggregata, orbiculares, medius measure 112.0-157.4 um diam. , convexa, atrobrunnea,

hymenium simplicia, margine fimbriata. *Asci* orbiculares vel ovaes, sessilis, & sporae, 37.5-56.3 x 61.2-67.5 μ m. *Ascospores* congestae, ellipticae, oblongae, uniseptatae, ad septatum constrictae, rotundate ad demum, subcaeruleus vel brunneolus flavae, glabro tunicatae, 8.1-16.2 x 24.0-37.5 μ m.

In foliis vivis *Syzygium henianum* (Myrtaceae) leg. M.A. Nomani, 18 January, 2010, Katarnia Ghat Wildlife Sancturay, U.P., MAN/SCT 18/26 isotype, Accession No. AMH-9504 Holotype.

Infection spots amphigenous, forming brownish black, circular, scattered or aggregated, dense, hard, widely effused patches upto 8.0 mm in diameter, coalescing to cover almost whole leaf surface but its original shape remains intact. *Mycelium* superficial, loosely reticulate, composed of dark-brown, septate, branched wavy hyphae, individual cells measuring 4.5-8.7 μ m in diameter, branching irregular; *Hyphopodia* mostly unilateral if bilateral it alternately arranged mostly bicellular sometimes unicellular, measuring 12.2-20.5 x 5.6-9.3 μ m, dark brown, straight to bent, lower cell of hyphopodia smaller, cylindric to cuneate, head cell capitate, spherical to hemispherical. *Thyriothecia* many, scattered or group, present in the mycelial colonies like alpin heads, rounded about 112.0-157.4 μ m in diameter, dimidiate with radiate scutellum stellately dehiscing at first, subsequent developing into an aperture, convex, dark brown, hymenium simple, margin fimbriate; *Asci* many, rounded to oval, sessile, 8-spored, measuring 37.5-56.3 x 61.2-67.5

μ m. *Ascospores* crowded, elliptical, oblong, uniseptate, constricted at the septum, rounded at ends, bluish brown to brownish yellow, smooth walled, measuring 8.1-16.2 x 24.0-37.5 μ m. (Fig.2; a,b,c,d,e)

On living leaves or *Syzygium henianum* (Myrtaceae) leg. M.A. Nomani, 18 January, 2010, Katarnia Ghat Wildlife Sancturay, U.P., MAN/SCT 18/26 isotype, Accession No. AMH-9504 Holotype.

A review of literature concerning taxonomy of *Asterina* species indicates that no species of this genus has earlier been described on the host species. However, this genus has been recorded on at least four host species different from *S. henianum*. These are *Asterina jambolana*, Kar & Maity (1970), *A. claviflori* Kar & Maity (1970), *A. gopalkrishnani*, Nair & Kaul (1987) and *A. disciferae* Hosag. et al. (1996) occurring on *Eugenia jambolana*, *Syzygium claviflorum*, *Syzygium cummuni* and *Eugenia discifera* respectively. The morphotaxonomic character of allied taxa and present species are shown in table.

As gathered from the data in table-2 the present collection is distinct from allied taxa in having irregularly branched mycelial hyphae which are brown in colour, longer and wider hyphopodia; *Thyriothecia* scattered or grouped like alpin head and smaller; *Asci* smaller and wider as well as bluish brown to yellow coloured ascospores.

Therefore, the present collection has been treated here as a new taxon of species rank.

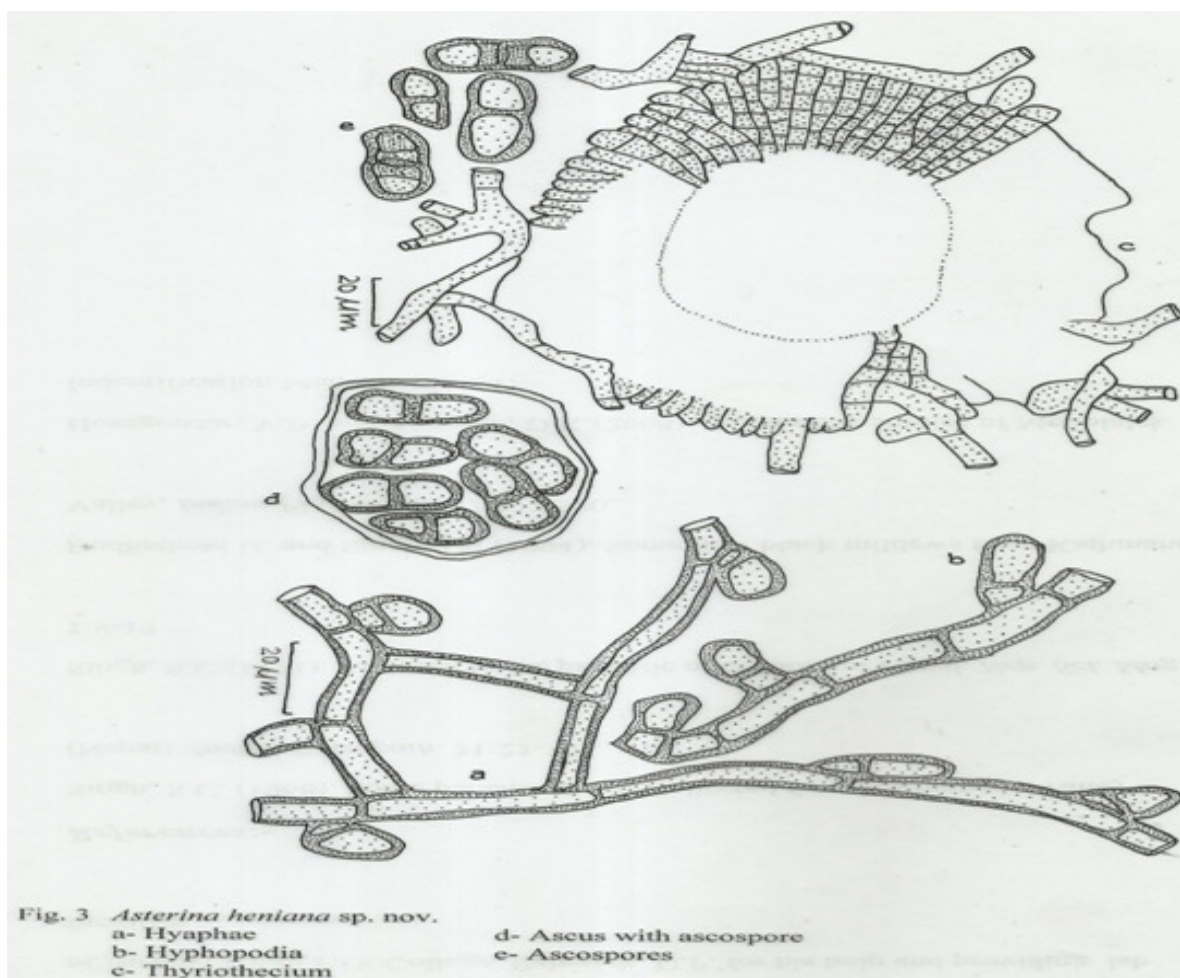


Fig. 3 *Asterina heniana* sp. nov.

a- Hyaphae

b- Hyphopodia

c- Thyriothecium

d- Ascus with ascospore

e- Ascospores

Table 2. A comparative account of morphotaxonomic features of *Asterina jambolanae*, *A. claviflori*, *A. gopalkrishnani*, *A. disciferae* with *A. heniana* sp. nov.

Species	Infection spots	Mycelium	Hyphopodia	Thyriothecia	Asci and Ascospores
<i>A. jambolanae</i> Kar & Maity (1970)	Both surface but vigorous growth on the upper surface, dense, effused, 6 mm in diameter.	Superficial, closely reticulate, brown branching alternate or one sided, rarely opposite 4-6.6 μ m in diameter.	Alternate or one sided, 2-celled, straight or bent, antrorse, 6.6-14.8 x 6.6 μ m.	Scattered or in groups, 198-331.5 μ m in diameter, convex, dark brown like pin heads.	Asci rounded to oval arranged towards the periphery of the fruiting body, sessile, 56-72.6 x 36.3-51 μ m, Ascospores elliptic, oblong, uniseptate brown, 33-34.6 x 15.8 μ m.
<i>A. claviflori</i> kar & maity (1970)	Usually upper surface, black, scattered., Orbicular, 5 mm in diameter	Superficial, loosely reticulate, rarely one-sided, straight to sub-straight.	Alternate to irregular, unicellular, cylindrical, straight, or slightly bent, 9.9-13.2 x 5.9 -6.6 μ m.	Scattered or grouped, like pin head, rounded, 231-297 μ m in diameter.	Asci arising towards the periphery of the Thyriothecia, fusiform, elliptical, sessile, 52.8-66 x 26.4-29.7 μ m paraphysate, Ascospores abovate, uniseptate, upper cell larger, 13.2 μ m in diameter, lower cell 9.9 x 6.6-9.9 μ m.
<i>A. gopalkrishnani</i> Nair & Kaul (1987)	Amphigenous, scattered or aggregated dense to sub-dense.	Superficial, reticulate substraight, cells 5-7 μ m in diameter.	Sessile, alternate, hemispherical, unicellular, 5.7 μ m broad.	Carbonaceous ostiolate, 226-240 μ m in diameter, stellately dehiscent.	Asci ovate, paraphysate, 50-65 x 25-50 μ m. Ascospores 2-celled, spiny brown with 2-dark brown bands in the middle or each cell.
<i>A. disciferae</i> Hosag. et al. (1996)	Epigenous, crustose, 2 mm in diameter.	Carbonaceous black, flexuous to crooked, branching opposite to irregular at acute angles, loosely to closely reticulate cells 6-8 μ m in diameter.	Carbonaceous black, 2-celled, stipulated antrorse to spreading, 12-15.5 μ m long.	Scattered, rarely connate, orbicular, 200-250 μ m in diameter, stellately dehiscing.	Asci 8 spored, globose to slightly ovate, 60-71.5 μ m, Ascospores cinnamon brown, oblong, uniseptate deeply constricted at septa 34-40.5 x 15-18 μ m.
<i>A. heniana</i> sp. nov.	Amphigenous scattered. Dense, coalescing to cover whole surface, 80 mm in diameter	Superficial, loosely reticulate, dark brown, wavy, branching irregular, cells 4.5-8.7 μ m in diameter.	Mostly unilateral and 2-celled, rarely bilateral, alternate and unicellular, dark brown, straight or bent, 12.2-20. 5 x 5.6- 9.3 μ m.	Many, scattered or grouped, like alpin heads, average diameter is 112.0-157.4 μ m, dark brown.	Asci oval, sessile, 8 spored, 37.5-56.3 x 6.12-67.5 μ m, Ascospores elliptical to oblong, uniseptate, bluish brown to yellowish 8.1-16.2 x 24.0-37.5 μ m.

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